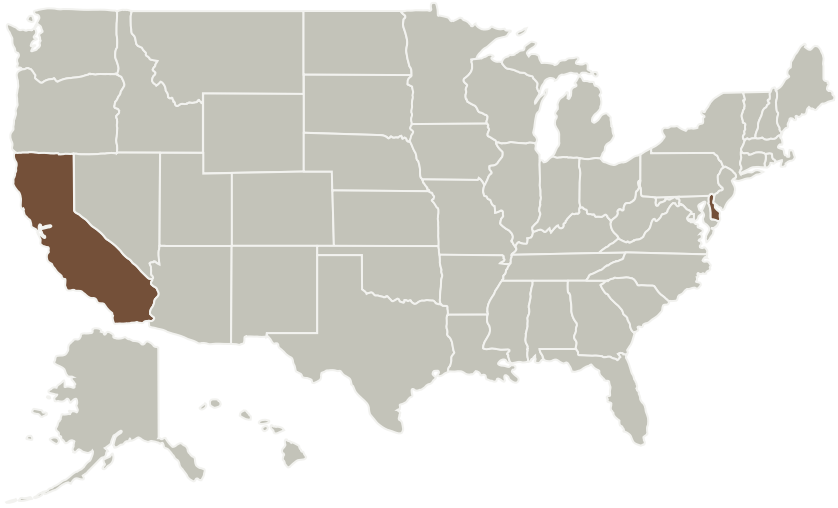
CURIE: Cubesat Radio Interferometry Experiment

Completed Technology Project (2017 - 2021)

Project Introduction

The CUbesat Radio Interferometry Experiment (CURIE) is a two-element radio interferometer, based on proven and developed digital radio receivers and designed to fit within a Cubesat platform. CURIE will launch as a 6U Cubesat and then separate into two 3U Cubesats once in orbit. CURIE measures radio waves from 0.1-19MHz, which must be measured from space, as those frequencies fall below the cutoff imposed by Earth's ionosphere. The principal science objective for CURIE is to use radio interferometry to study radio burst emissions from solar eruptive events such as flares and coronal mass ejections (CMEs) in the inner heliosphere, providing observations important for our understanding of the heliospheric space weather environment. The influence of space weather can be felt at Earth and other planets, as radiation levels increase and lead to auroral activity and geomagnetic effects. CURIE will be able to determine the location and size of radio burst source regions and then to track their movement outward from the Sun. In addition to the primary objective CURIE will measure the gradients of the local ionospheric density and electron temperature on the spatial scale of a few kilometers, as well as create an improved map of the radio sky at these unexplored frequencies. A space based radio interferometry observatory has long been envisioned, in orbit around the Earth or the Moon, or on the far side of the Moon. Beyond its important science objectives, CURIE will prove that the concept of a dedicated space-based interferometer can be realized by using relatively cheap Cubesats. CURIE will therefore not only provide new important science results but also serve as a pathfinder in the development of new space-based radio observation techniques for helio- and astro-physics.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

Heliophysics Technology and Instrument Development for Science

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Organizations Performing Work	Role	Type	Location
Regents of the University of California	Supporting Organization	Academia	Oakland, California

Primary U.S. Work Locations	
California	Delaware

Project Management

Program Director:

Roshanak Hakimzadeh

Program Manager:

Roshanak Hakimzadeh

Principal Investigator:

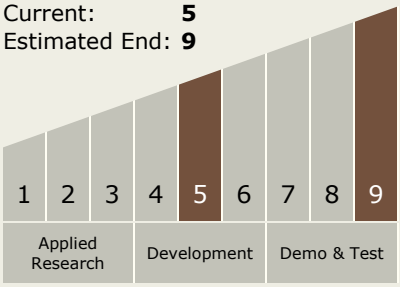
David J Sundkvist

Co-Investigators:

Hazel M Bain
Stuart Bale
John W Bonnell
Gordon J Hurford
Juan Carlos Martinez Oliveros
Bennett A Maruca
Marc P Pulupa
Pascal Saint-hilaire
Joyce So

Technology Maturity (TRL)

Start: **5**
Current: **5**
Estimated End: **9**



Technology Areas

Primary:

- TX08 Sensors and Instruments

Continued on following page.

Technology Areas *(cont.)*

- TX08.2 Observatories
  - TX08.2.3 Distributed Aperture

Target Destination

The Sun